

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
14 October 2004 (14.10.2004)

PCT

(10) International Publication Number
WO 2004/087746 A3

(51) International Patent Classification⁷: **C12N 15/31**,
C07K 14/31, C12R 1/44, C07K 16/12, C12Q 1/68, A61K
39/085, G01N 33/68

(21) International Application Number:
PCT/EP2004/003398

(22) International Filing Date: 31 March 2004 (31.03.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
03450078.5 31 March 2003 (31.03.2003) EP

(71) Applicant (for all designated States except US): **INTER-CELL AG** [AT/AT]; Campus Vienna Biocenter 6, A-1030 Vienna (AT).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **MEINKE, Andreas** [DE/AT]; Piettegassee 26/1, A-3013 Pressbaum (AT). **MIN BUI, Duc** [VN/AT]; Rudolf Zeller Gasse 70/6/9, A-1230 Vienna (AT). **NAGY, Eszter** [HU/AT]; Taborstrasse 9, A-1020 Vienna (AT).

(74) Agent: **SONN & PARTNER PATENTANWÄLTE**; Riemergasse 14, A-1010 Vienna (AT).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations
- of inventorship (Rule 4.17(iv)) for US only

Published:

- with international search report

(88) Date of publication of the international search report:

21 April 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **STAPHYLOCOCCUS EPIDERMIDIS ANTIGENS**

(57) Abstract: The present invention discloses isolated nucleic acid molecules encoding a hyperimmune serum reactive antigen or a fragment thereof as well as hyperimmune serum reactive antigens or fragments thereof from *S. epidermidis*, methods for isolating such antigens and specific uses thereof.

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2004/003398

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/31 C07K14/31 C12R1/44 C07K16/12 C12Q1/68
A61K39/085 G01N33/68

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N C07K A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, Sequence Search, BIOSIS, EMBASE, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|------------------------|
| X | WO 02/077183 A (MALONE CHERYL ; OHLSEN KARI L (US); WALL DANIEL (US); XU H HOWARD (US)) 3 October 2002 (2002-10-03) claims; sequences 71020,34836 | 1,2, 5-11, 14-37 |
| X,L | -& DATABASE EMBL 3 October 2002 (2002-10-03), WANG ET AL: XP002293899 retrieved from EBI Database accession no. ABU43096 L: Sequence information for SEQ ID NO: 71020 of WO 02/077183 abstract -/-- | 1,2, 5-11, 14-37 |

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
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- "P" document published prior to the International filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

26 August 2004

Date of mailing of the International search report

11. 01. 2005

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Madruga, J

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2004/003398

| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT | | |
|--|--|------------------------|
| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| X,L | -& DATABASE EMBL 3 October 2002 (2002-10-03), WANG ET AL: XP002293900 retrieved from EVI Database accession no. ACA46966 L: Sequence information for SEQ ID NO: 34836 of WO 02/077183 abstract | 1,2, 5-11, 14-37 |
| X | ----- DATABASE EMBL 1 March 2003 (2003-03-01), "Hypothetical protein SE2232" XP002293901 retrieved from EBI Database accession no. Q8CQX2 abstract | 1,2, 5-11, 14-37 |
| X | -& DATABASE EMBL 2 January 2003 (2003-01-02), "Staphylococcus epidermidis ATCC 12228, section 8 of 9 of the complete genome" XP002293902 retrieved from EBI Database accession no. AE016751 abstract | 1,2, 5-11, 14-37 |
| P,X | -& ZHANG YUE-QING ET AL: "Genome-based analysis of virulence genes in a non-biofilm-forming Staphylococcus epidermidis strain (ATCC 12228)." MOLECULAR MICROBIOLOGY, vol. 49, no. 6, September 2003 (2003-09), pages 1577-1593, XP002293898 ISSN: 0950-382X the whole document | 1,2, 5-11, 14-37 |
| X | ----- US 6 380 370 B1 (DOUCETTE-STAMM LYNN A ET AL) 30 April 2002 (2002-04-30) column 37 - column 40; claims; sequences 4318,1481 column 311 column 1 - column 2 | 1,2, 5-11, 14-37 |
| X,L | -& DATABASE EMBL 30 April 2002 (2002-04-30), "Staphylococcus epidermidis ORF amino acid sequence SEQ ID NO:4318" XP002293903 retrieved from EBI Database accession no. ABP39473 L: Sequence information for SEQ ID NO: 4318 of US6380370 abstract -/-- | 1,2, 5-11, 14-37 |

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/003398

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|------------------------|
| X,L | -& DATABASE EMBL 24 July 2002 (2002-07-24), "Staphylococcus epidermidis ORF nucleic acid sequence SEQ ID NO:1481" XP002293904 retrieved from EBI Database accession no. ABN92018 L: Sequence information for SEQ ID NO: 1481 of US6380370 abstract | 1,2, 5-11, 14-37 |
| X | ----- WO 01/34809 A (GLAXO GROUP LTD ; KIMMERLY WILLIAM JOHN (US)) 17 May 2001 (2001-05-17) Sequence Listing pages 260, 261, 823, 824, 1257, 1258 page 20, line 19 - line 27; claims; sequences 1048,3390,1047,3689,3431,4244,4408 page 33, line 9 - page 35, line 13 | 1,2, 5-11, 14-37 |
| A | ----- WO 02/059148 A (CISTEM BIOTECHNOLOGIES GMBH ; AHSEN UWE (AT); ETZ HILDEGARD (AT); HAFN) 1 August 2002 (2002-08-01) cited in the application page 49 - page 53; claims 10,20,23; table 2c | |
| P,A | ----- HENICS T ET AL: "Small-fragment genomic libraries for the display of putative epitopes from clinically significant pathogens." BIOTECHNIQUES, vol. 35, no. 1, July 2003 (2003-07), pages 196-209, XP002293668 ISSN: 0736-6205 the whole document | |

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2004/003398

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1, 2, 5-11, 14-37 (all in part as applicable)

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

Invention: 1; claims 1,2,5-11,14-37(all in part, as applicable)

A nucleic acid encoding a hyperimmune serum reactive antigen, a hyperimmune serum reactive antigen, a fragment of said hyperimmune serum reactive antigen; an antibody against said hyperimmune serum reactive antigen or fragment; a process for producing said nucleic acid, hyperimmune serum reactive antigen, fragment or antibody; a pharmaceutical composition comprising said nucleic acid, hyperimmune serum reactive antigen, fragment or antibody; methods of identifying an agonist or antagonist; methods of diagnosis, uses of the nucleic acid, the hyperimmune serum reactive antigen or fragment in the manufacture of an aptamer, spiegelmer, ribozyme, antisense oligonucleotide or siRNA, all of them relating to the nucleic acid of SEQ ID NO: 1, the hyperimmune serum reactive antigen of SEQ ID NO: 32 and the fragment comprising amino acids 6-28 of SEQ ID NO: 32.

Inventions: 2-31; claims: 1-37 (all in part and as applicable)

A nucleic acid encoding a hyperimmune serum reactive antigen, a hyperimmune serum reactive antigen, a fragment of said hyperimmune serum reactive antigen; an antibody against said hyperimmune serum reactive antigen or fragment; a process for producing said nucleic acid, hyperimmune serum reactive antigen, fragment or antibody; a pharmaceutical composition comprising said nucleic acid, hyperimmune serum reactive antigen, fragment or antibody; methods of identifying an agonist or antagonist; methods of diagnosis, uses of the nucleic acid, the hyperimmune serum reactive antigen or fragment in the manufacture of a medicament, an aptamer, spiegelmer, ribozyme, antisense oligonucleotide or siRNA, all of them relating to the nucleic acid of SEQ ID NOs: 2-31 and the polypeptides encoded by said nucleic acid, SEQ ID NO: 33-62, respectively

Inventions: 32-55; claims 1,2,5-11,14-37(all in part, as applicable).

As for invention 1, all relating to a fragment of SEQ ID NO: 151, comprising amino acids:
54-59 (Invention 32), 135-147, 193-205, 274-279, 284-291, 298-308, 342-347, 360-366, 380-386, 408-425, 437-446, 457-464, 467-477, 504-510, 517-530, 535-543, 547-553, 562-569, 573-579, 592-600, 602-613, 626-631, 638-668, and 396-449 (Invention 55) of SEQ ID NO: 32, respectively.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2004/003398

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---------------------|----------------------------|-----------------------------|
| WO 02077183 | A | 03-10-2002 | US 2002061569 A1 23-05-2002 |
| | | | WO 02077183 A2 03-10-2002 |
| | | | US 2004029129 A1 12-02-2004 |
| US 6380370 | B1 | 30-04-2002 | US 2004147734 A1 29-07-2004 |
| WO 0134809 | A | 17-05-2001 | AU 1478301 A 06-06-2001 |
| | | | WO 0134809 A2 17-05-2001 |
| | | | US 6703492 B1 09-03-2004 |
| WO 02059148 | A | 01-08-2002 | AT 410798 B 25-07-2003 |
| | | | AT 1302001 A 15-12-2002 |
| | | | BR 0207067 A 15-06-2004 |
| | | | CA 2436057 A1 01-08-2002 |
| | | | CZ 20032201 A3 17-03-2004 |
| | | | WO 02059148 A2 01-08-2002 |
| | | | EP 1355930 A2 29-10-2003 |
| | | | JP 2004531476 T 14-10-2004 |
| | | | NO 20033364 A 24-09-2003 |